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Facial Fractures

FEW AREAS OF PLASTIC SURGERY have changed as rapidly as the management of complex facial fractures. Just over a decade ago, these patients were treated with a conservative "wait and see" attitude, and the subsequent deformities that developed were hard to correct. Those patients who did undergo surgical therapy early were treated with small incisions, minimal exposure of fracture segments, and fixation with wires or external devices, frequently yielding poor functional and aesthetic results. This conservative approach, with delayed operative repair, has evolved to an aggressive, early, one-stage approach. This evolution has been made possible by several developments, most notably the contributions of Paul Tessier of Paris, who is considered the father of craniofacial surgery. Tessier showed that it was possible to expose nearly the entire craniofacial skeleton through relatively hidden incisions and to "work" on the bone. This may consist of osteotomy and repositioning of a segment of bone to a more functional or aesthetic position or, as in the case of displaced facial bone fractures, repositioning the bone to its proper anatomic position.

Several principles have evolved to guide us in our care of patients with facial trauma. First, a precise anatomic diagnosis is imperative. The history and physical examination are supplemented by computed tomographic (CT) scans as indicated. The precision of CT is such that with both axial and coronal cuts, the fracture pattern can be precisely identified. The CT scan allows those patients to be selected who may not require surgical intervention and, for those who require surgical therapy, the precise planning of the operative procedure.

Through a combination of coronal, upper and lower eyelid, and intraoral incisions, nearly the entire craniofacial skeleton can be approached through subperiosteal dissection. Fracture segments are identified and reduced to their proper anatomic position. Inadequate exposure of fracture segments may result in inadequate fracture reduction and malpositioning, leading to a difficult-to-correct secondary deformity. Three-dimensional reconstruction to restore preinjury facial height, width, projection, and a functional occlusion is the goal.

After fracture exposure and anatomic reduction, the bones must be held in position during the healing phase. Internal fixation devices—tiny plates and screws, some less than 1 mm in thickness—are frequently used to stabilize the bony fragments. With the development of the principle of primary bone grafting, the incidence of secondary soft tissue scarring and contraction and associated deformities has been dramatically reduced. Bone grafts are used to replace missing or damaged bone or to correct contour deformities. Outer table cranial bone provides an excellent source in patients with craniofacial trauma.

As part of the goal of reestablishing the pretraumatic appearance, management of the soft tissue of the face is critical. Areas of abrasion are meticulously cleaned and debrided as necessary, and soft tissue lacerations are repaired anatomically. After subperiosteal dissection to expose the facial skeleton, most of the soft tissue attachments to the underlying skeleton are lost. It is important to resuspend the soft tissue envelope over the underlying foundation. This is accomplished by attaching with sutures the periosteum from the soft tissue envelope to the skeleton either directly to remaining periosteum or occasionally to plates and screws that were used for fixating fracture fragments. This will redrape the soft tissue envelope and prevent the soft tissue droop that in the past has been associated with wide exposure of complex fractures of the face.

The principles of the management of complex facial fractures continue to evolve. A more aggressive approach using craniofacial principles and techniques, including anatomic fracture fragment reduction, relatively rigid internal fixation with primary bone grafting as necessary, and definitive soft tissue management, seems to have dramatically diminished the incidence of secondary deformities associated with these devastating injuries.

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Role of Endoscopic-Assisted Plastic Surgery in Aesthetic Therapy

THE PROLIFERATION OF endoscopic procedures in the surgical specialties has been astounding. In general surgery, over a several-year period laparoscopic cholecystectomy has gone from a curiosity to the most commonly performed general surgical procedure. Today, virtually every field has found valid application for endoscopy based on the premise that these techniques diminish patient morbidity compared with "open" procedures. In no specialty is patient morbidity of more concern than in aesthetic plastic surgery.

The most common endoscopic procedure currently done by plastic surgeons is the brow lift. In its traditional form, this requires elevating a transcoronal flap (an incision across the top of the scalp from ear to ear) anteriorly to the level of the supraorbital rim with the resection of corrugator and procerus muscles, followed by the excision of excess brow skin. With the use of the endoscope, the forehead can be elevated in a subgaleal or subperiosteal plane by several small (1.5 to 2 cm) transverse or longitudinal incisions within the hairline. At the level of the orbital rim, the periosteal attachments of the brow are sharply released, and the depressor muscles are resected with grasping forceps while visualizing the supraorbital

and supratrochlear nerves. Galeal suspension is accomplished by plication sutures at the level of the skin incisions or by fixation to microscrews placed in the calvarium. Skin resection is generally not necessary.

The advantage of this technique is greater patient acceptance of the procedure. Early reports have indicated that endoscopic brow lifts are accompanied by diminished bleeding and swelling, less scalp anesthesia, and a less noticeable scar. In a review of 61 patients undergoing endoscopic brow lift, no important complications occurred, and results were equal to those with the open coronal approach.

The natural extension of this procedure, endoscopic face lift, is also gaining acceptance. Patient selection for this procedure is critical. Ideal candidates are younger (<50 years of age) and have good skin tone without nasolabial folds or prominent malar fat pads. Patients with substantial skin redundancy are best served by standard rhytidectomy. The endoscopic dissection is accomplished in the subcutaneous plane in the lower half of the face and in a subperiosteal plane in the upper third of the face by two temporal and posterior mastoid incisions about 1.5 cm long. An intraoral buccal sulcus and lower blepharoplasty incision can be used. After wide undermining, the soft tissues are suspended by endoscopically tied knots to the temporalis fascia and periosteum. The neck can also be treated using endoscopy or by direct vision through a submental incision.

Several other procedures, including abdominoplasty and breast augmentation, are currently being studied for their applicability to endoscopic-assisted dissection, and the list will undoubtedly continue to grow. Surgeons should view the current wave of enthusiasm for endoscopic plastic surgery with a note of caution, however. As with most new medical advances, the indications and applications are likely to be extended unnecessarily initially. Not until further experience with these techniques is reported should endoscopic manipulation in plastic surgery become routine.

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Chemical Peels in Plastic Surgery

CHEMICAL PEELS have gained widespread acceptance in the treatment of aging faces. Used appropriately, peels have proved effective in treating actinic damage, including fine wrinkles, pigmentary abnormalities, and dryness. Superficial acne scarring also responds favorably.

Many chemicals are available for facial peeling, including phenol, trichloroacetic acid (TCA), and the α-hydroxy acids. All act by varying degrees of cellular destruction of the epidermis and papillary dermis, producing consistent histologic changes. These include homogenization of the dermal collagen structure, the diminution of melanin granules in the basal epidermis, and an increase in elastic tissue. This results in a leveling of superficial irregularities including fine wrinkles.

Phenol, the most commonly used agent, is a derivative of coal tar. Popularized by the work of Baker and Gordon in the 1960s, it is generally used at a concentration of 50%. Higher concentrations result in increased toxicity without additional therapeutic benefit. Infrequently, phenol can cause cardiac arrhythmias, and full-face phenol treatments should not be done without continuous electrocardiographic monitoring and intravenous access. This complication is more common when more than 50% of the face is treated in less than 30 minutes.

Phenol is mixed in a formula consisting of 3 ml of phenol, 2 ml of water, 8 drops of soap, and 3 drops of croton oil. After applying, many practitioners place a light layer of antibiotic ointment to prevent evaporation and enhance wound healing.

Trichloroacetic acid is used at concentrations varying from 15% to 50%, with higher concentrations producing deeper peels. Unlike with phenol, there is no systemic toxicity, and the response to the agent is not all or none. The results obtained are highly dependent on prepeel skin preparation, including washing with soap, degreasing with acetone or ether, and applying a keratinolytic agent such as Jessner's solution (resorcinol, salicylic acid, and lactic acid) to disrupt the stratum corneum. Failing to prepare the skin adequately can result in a spotty peel. The method of application can enhance results. Repeated application or vigorous rubbing of the acid into the treated area increases the depth of penetration.

The α-hydroxy acids have enjoyed a recent burst of popularity among lay practitioners of skin care. All are derived from the fermentation of natural food sources such as fruit, with the first documented use occurring in ancient Egypt when sour milk (lactic acid) was applied to the face to enhance beauty. At low concentrations (usually less than 10%), these substances are found in over-the-counter skin preparations. Their effect is based on reducing the cohesion of the keratinocytes, producing desquamation and epidermolysis. They have a good safety profile but limited clinical efficacy. The most commonly used fruit acid, glycolic acid, works to loosen the buildup of dead skin cells. Over a series of treatments in a six- to eight-week period, this exfoliation process results in softer and smoother skin. The duration of effects is being studied. Currently, only plastic surgeons and dermatologists are doing TCA and phenol peels, as well as α-hydroxy peels of a 50% to 70% concentration.

After a facial peel, patients can expect crusting to occur in the first three to five days. During this time, they are instructed to apply topical antibiotic ointment. By 10 to 14 days, the crusting has resolved, with the underlying skin taking on an erythematous appearance. Moisturizing lotion is used liberally to prevent secondary drying and